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Approximate computation of **multidimensional** aggregates of sparse data using wavelets - group of 13 »

JS Vitter, M Wang - Proceedings of the 1999 ACM SIGMOD international conference ..., 1999 - portal.acm.org

... random sampling and other **histogram**-based approaches. ... extended naturally to the **multi-**

dimensional case ... decomposition of the **multidimensional** array S, obtaining ...

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Dynamic **multidimensional** histograms - group of 5 »

N Thaper, S Guha, P Indyk, N Koudas - Proceedings of the 2002 ACM SIGMOD international conference ..., 2002 - portal.acm.org

... to extract a **k-histogram** according to ... heuristic approaches to extract **multi-dimensional**

histograms from ... 4. SKETCHING MULTIDIMENSIONAL DIS- TRIBUTIONS We will ...

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Approximate query processing using wavelets - group of 33 »

K Chakrabarti, MN Garofalakis, R Rastogi, K Shim - US Patent 6,760,724, 2004 - Google Patents

... it is known that **histogram**-based approaches ... gen -erated during the **multi-dimensional**

Haar decomposition ... corresponding locations of a 4x4 **wavelet** transform array W ...

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Wavelet-based cost estimation for spatial queries - group of 6 »

M Wang, JS Vitter, L Lim, S Padmanabhan - Proc. of SSTD, 2001 - Springer

... how to do the sparse **wavelet** decomposition in ... then be accessed by a

multidimensional

point access ... we can use various **multi-dimensional histogram** methods that ...

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Dynamic Maintenance of **Wavelet**-Based Histograms - group of 12 »

Y Matias, JS Vitter, M Wang - Proc. of the 2000 Intl. Conf. on Very Large Data Bases, 2000 - acm.org

... histograms based upon a **multidimensional wavelet** decomposition ... both one-dimensional

and **multi- dimensional** equi-depth ... given partition-based **histogram** through a ...

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Maintenance of **Multidimensional** Histograms - group of 4 »

S Muthukrishnan, M Strauss - Proc. of FSTTCS, 2003 - Springer

... them with techniques known for offline **multidimensional** histogramming [1 ... good approximation to the best **histogram** (we provide ... We first define Haar **wavelets** on ...

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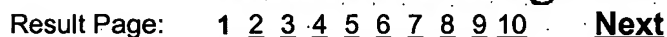
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1 Selectivity estimators for multidimensional range queries over real attributes

Dimitrios Gunopulos, George Kollios, J. Tsotras, Carlotta Domeniconi

 April 2005 **The VLDB Journal — The International Journal on Very Large Data Bases**,
Volume 14:Issue 2

Publisher: Springer-Verlag New York, Inc.

 Full text available: [pdf\(321.96 KB\)](#) Additional Information: [full citation](#), [abstract](#)

Estimating the selectivity of multidimensional range queries over real valued attributes has significant applications in data exploration and database query optimization. In this paper, we consider the following problem: given a table of d attributes whose domain is the real numbers and a query that specifies a range in each dimension, find a good approximation of the number of records in the table that satisfy the query. The simplest approach to tackle this problem is to assume that the ...

2 STHoles: a multidimensional workload-aware histogram

Nicolas Bruno, Surajit Chaudhuri, Luis Gravano

 May 2001 **ACM SIGMOD Record , Proceedings of the 2001 ACM SIGMOD international conference on Management of data SIGMOD '01**, Volume 30 Issue 2

Publisher: ACM Press

 Full text available: [pdf\(429.21 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Attributes of a relation are not typically independent. Multidimensional histograms can be an effective tool for accurate multiattribute query selectivity estimation. In this paper, we introduce *STHoles*, a "workload-aware" histogram that allows bucket nesting to capture data regions with reasonably uniform tuple density. *STHoles* histograms are built without examining the data sets, but rather by just analyzing query results. Buckets are allocated where needed the most ...

3 Wavelet synopses for general error metrics

Minos Garofalakis, Amit Kumar

 December 2005 **ACM Transactions on Database Systems (TODS)**, Volume 30 Issue 4

Publisher: ACM Press

 Full text available: [pdf\(1.32 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Several studies have demonstrated the effectiveness of the wavelet decomposition as a tool for reducing large amounts of data down to compact *wavelet synopses* that can be used to obtain fast, accurate approximate query answers. Conventional wavelet synopses

10/822992

that greedily minimize the overall root-mean-squared (i.e., L_2 -norm) error in the data approximation can suffer from important problems, including severe bias and wide variance in the quality of the data reconstruction ...

Keywords: Data synopses, Haar wavelets, approximate query processing

4 GPGPU: general purpose computation on graphics hardware


 David Luebke, Mark Harris, Jens Krüger, Tim Purcell, Naga Govindaraju, Ian Buck, Cliff Woolley, Aaron Lefohn
August 2004 **ACM SIGGRAPH 2004 Course Notes SIGGRAPH '04**

Publisher: ACM Press


Full text available:  pdf(63.03 MB) Additional Information: [full citation](#), [abstract](#), [citations](#)

The graphics processor (GPU) on today's commodity video cards has evolved into an extremely powerful and flexible processor. The latest graphics architectures provide tremendous memory bandwidth and computational horsepower, with fully programmable vertex and pixel processing units that support vector operations up to full IEEE floating point precision. High level languages have emerged for graphics hardware, making this computational power accessible. Architecturally, GPUs are highly parallel s ...

5 Query evaluation techniques for large databases

 Goetz Graefe
June 1993 **ACM Computing Surveys (CSUR)**, Volume 25 Issue 2

Publisher: ACM Press

Full text available:  pdf(9.37 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#), [processing](#)

Database management systems will continue to manage large data volumes. Thus, efficient algorithms for accessing and manipulating large sets and sequences will be required to provide acceptable performance. The advent of object-oriented and extensible database systems will not solve this problem. On the contrary, modern data models exacerbate the problem: In order to manipulate large sets of complex objects as efficiently as today's database systems manipulate simple records, query-processi ...

Keywords: complex query evaluation plans, dynamic query evaluation plans, extensible database systems, iterators, object-oriented database systems, operator model of parallelization, parallel algorithms, relational database systems, set-matching algorithms, sort-hash duality

6 Approximate query processing using wavelets

Kaushik Chakrabarti, Minos Garofalakis, Rajeev Rastogi, Kyuseok Shim
September 2001 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 10 Issue 2-3

Publisher: Springer-Verlag New York, Inc.

Full text available:  pdf(390.24 KB) Additional Information: [full citation](#), [abstract](#), [citations](#), [index terms](#)

Approximate query processing has emerged as a cost-effective approach for dealing with the huge data volumes and stringent response-time requirements of today's decision support systems (DSS). Most work in this area, however, has so far been limited in its query processing scope, typically focusing on specific forms of aggregate queries. Furthermore, conventional approaches based on sampling or histograms appear to be inherently limited when it comes to approximating the results of complex queri ...

Keywords: Approximate query answers, Data synopses, Query processing, Wavelet decomposition

7 Probabilistic wavelet synopses

Minos Garofalakis, Phillip B. Gibbons

March 2004 **ACM Transactions on Database Systems (TODS)**, Volume 29 Issue 1

Publisher: ACM Press

Full text available: pdf(668.62 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Recent work has demonstrated the effectiveness of the wavelet decomposition in reducing large amounts of data to compact sets of wavelet coefficients (termed "wavelet synopses") that can be used to provide fast and reasonably accurate approximate query answers. A major shortcoming of these existing wavelet techniques is that the quality of the approximate answers they provide varies widely, even for identical queries on nearly identical values in distinct parts of the data. As a result, users ha ...

Keywords: Wavelets, approximate query processing, data synopses, randomized rounding

8 Symbolic bounds analysis of pointers, array indices, and accessed memory regions

Radu Rugina, Martin C. Rinard

March 2005 **ACM Transactions on Programming Languages and Systems (TOPLAS)**, Volume 27 Issue 2

Publisher: ACM Press

Full text available: pdf(490.56 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This article presents a novel framework for the symbolic bounds analysis of pointers, array indices, and accessed memory regions. Our framework formulates each analysis problem as a system of inequality constraints between symbolic bound polynomials. It then reduces the constraint system to a linear program. The solution to the linear program provides symbolic lower and upper bounds for the values of pointer and array index variables and for the regions of memory that each statement and procedur ...

Keywords: Symbolic analysis, parallelization, static race detection

9 External memory algorithms and data structures: dealing with massive data

Jeffrey Scott Vitter

June 2001 **ACM Computing Surveys (CSUR)**, Volume 33 Issue 2

Publisher: ACM Press

Full text available: pdf(828.46 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Data sets in large applications are often too massive to fit completely inside the computers internal memory. The resulting input/output communication (or I/O) between fast internal memory and slower external memory (such as disks) can be a major performance bottleneck. In this article we survey the state of the art in the design and analysis of external memory (or EM) algorithms and data structures, where the goal is to exploit locality in order to reduce the I/O costs. We consider a varie ...

Keywords: B-tree, I/O, batched, block, disk, dynamic, extendible hashing, external memory, hierarchical memory, multidimensional access methods, multilevel memory, online, out-of-core, secondary storage, sorting program, the solution to the ...

10 Independence is good: dependency-based histogram synopses for high-dimensional

**data**

Amol Deshpande, Minos Garofalakis, Rajeev Rastogi

May 2001 **ACM SIGMOD Record , Proceedings of the 2001 ACM SIGMOD international conference on Management of data SIGMOD '01**, Volume 30 Issue 2

Publisher: ACM Press

Full text available: pdf(237.18 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Approximating the joint data distribution of a multi-dimensional data set through a compact and accurate histogram synopsis is a fundamental problem arising in numerous practical scenarios, including query optimization and approximate query answering. Existing solutions either rely on simplistic independence assumptions or try to directly approximate the full joint data distribution over the complete set of attributes. Unfortunately, both approaches are doomed to fail for high-dimensional data ...

11 Approximation and streaming algorithms for histogram construction problems

Sudipto Guha, Nick Koudas, Kyuseok Shim

March 2006 **ACM Transactions on Database Systems (TODS)**, Volume 31 Issue 1

Publisher: ACM Press

Full text available: pdf(1.38 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Histograms and related synopsis structures are popular techniques for approximating data distributions. These have been successful in query optimization and a variety of applications, including approximate querying, similarity searching, and data mining, to name a few. Histograms were a few of the earliest synopsis structures proposed and continue to be used widely. The histogram construction problem is to construct the best histogram restricted to a space bound that reflects the data distribution ...

Keywords: Data Streams, approximation algorithm, histograms**12 A query language for multidimensional arrays: design, implementation, and optimization techniques**

Leonid Libkin, Rona Machlin, Limsoon Wong

June 1996 **ACM SIGMOD Record , Proceedings of the 1996 ACM SIGMOD international conference on Management of data SIGMOD '96**, Volume 25 Issue 2

Publisher: ACM Press

Full text available: pdf(1.38 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

While much recent research has focussed on extending databases beyond the traditional relational model, relatively little has been done to develop database tools for querying data organized in (multidimensional) arrays. The scientific computing community has made little use of available database technology. Instead, multidimensional scientific data is typically stored in local files conforming to various data exchange formats and queried via specialized access libraries tied in to general purpose ...

13 An Integrated Memory Array Processor Architecture for Embedded Image Recognition Systems

Shorin Kyo, Shin'ichiro Okazaki, Tamio Arai

May 2005 **ACM SIGARCH Computer Architecture News , Proceedings of the 32nd Annual International Symposium on Computer Architecture ISCA '05**, Volume 33 Issue 2

Publisher: IEEE Computer Society, ACM Press

Full text available: pdf(619.98 KB)

Additional Information: [full citation](#), [abstract](#), [index terms](#)

Embedded processors for video image recognition require to address both the cost (die

size and power) versus real-time performance issue, and also to achieve high flexibility due to the immense diversity of recognition targets, situations, and applications. This paper describes IMAP, a highly parallel SIMD linear processor and memory array architecture that addresses these trading-off requirements. By using parallel and systolic algorithmic techniques, despite of its simple architecture IMAP ach ...

14 Optimizing bitmap indices with efficient compression



Kesheng Wu, Ekow J. Otoo, Arie Shoshani

March 2006 **ACM Transactions on Database Systems (TODS)**, Volume 31 Issue 1

Publisher: ACM Press

Full text available: pdf(742.48 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Bitmap indices are efficient for answering queries on low-cardinality attributes. In this article, we present a new compression scheme called *Word-Aligned Hybrid* (WAH) code that makes compressed bitmap indices efficient even for high-cardinality attributes. We further prove that the new compressed bitmap index, like the best variants of the B-tree index, is optimal for one-dimensional range queries. More specifically, the time required to answer a one-dimensional range query is a linear f ...

Keywords: Compression, bitmap index, query processing

15 Level set and PDE methods for computer graphics



David Breen, Ron Fedkiw, Ken Museth, Stanley Osher, Guillermo Sapiro, Ross Whitaker

August 2004 **ACM SIGGRAPH 2004 Course Notes SIGGRAPH '04**

Publisher: ACM Press

Full text available: pdf(17.07 MB) Additional Information: [full citation](#), [abstract](#), [citations](#)

Level set methods, an important class of partial differential equation (PDE) methods, define dynamic surfaces implicitly as the level set (iso-surface) of a sampled, evolving nD function. The course begins with preparatory material that introduces the concept of using partial differential equations to solve problems in computer graphics, geometric modelling and computer vision. This will include the structure and behavior of several different types of differential equations, e.g. the level set eq ...

16 Query processing techniques for arrays

Arunprasad P. Marathe, Kenneth Salem

August 2002 **The VLDB Journal — The International Journal on Very Large Data**

Bases, Volume 11 Issue 1

Publisher: Springer-Verlag New York, Inc.

Full text available: pdf(322.53 KB) Additional Information: [full citation](#), [abstract](#), [index terms](#)



Arrays are a common and important class of data. At present, database systems do not provide adequate array support: arrays can neither be easily defined nor conveniently manipulated. Further, array manipulations are not optimized. This paper describes a language called the *Array Manipulation Language* (AML), for expressing array manipulations, and a collection of optimization techniques for AML expressions. In the AML framework for array manipulation, arbitrary externally-defined functions ...

Keywords: Array manipulation language, Array query optimization, Declarative query language, Memory-usage optimization, Pipelined evaluation, User-defined functions

17



Data and memory optimization techniques for embedded systems

P. R. Panda, F. Catthoor, N. D. Dutt, K. Danckaert, E. Brockmeyer, C. Kulkarni, A.

-  Vandercappelle, P. G. Kjeldsberg
 April 2001 **ACM Transactions on Design Automation of Electronic Systems (TODAES)**,
 Volume 6 Issue 2
Publisher: ACM Press
 Full text available:  [pdf\(339.91 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)



We present a survey of the state-of-the-art techniques used in performing data and memory-related optimizations in embedded systems. The optimizations are targeted directly or indirectly at the memory subsystem, and impact one or more out of three important cost metrics: area, performance, and power dissipation of the resulting implementation. We first examine architecture-independent optimizations in the form of code transformations. We next cover a broad spectrum of optimizati ...

Keywords: DRAM, SRAM, address generation, allocation, architecture exploration, code transformation, data cache, data optimization, high-level synthesis, memory architecture customization, memory power dissipation, register file, size estimation, survey

- 18 Session F6: VR human motion and posture: Hypercube sweeping algorithm for subsequence motion matching in large motion databases
 Clifford K. F. So, George Baci
 June 2006 **Proceedings of the 2006 ACM international conference on Virtual reality continuum and its applications VRCIA '06**
Publisher: ACM Press
 Full text available:  [pdf\(595.12 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

Current optical motion capture devices are capable of capturing motion at frequencies exceeding 1000Hz thereby generating gigabytes of motion data. In this paper we propose a method to solve the problem of subsequence motion matching in large motion databases. Our method supports non-uniform time-scaling. We begin with a polar-angle representation of the motion that gives a continuous thread in a multi-dimensional space. We improve the performance of the matching process by generating a motion c ...

Keywords: motion capture animation, multi-dimensional time-series data, non-uniform time-warping, subsequence matching

- 19 Data mining and aggregation: A study on workload-aware wavelet synopses for point and range-sum queries
 Michael Mathioudakis, Dimitris Sacharidis, Timos Sellis
 November 2006 **Proceedings of the 9th ACM international workshop on Data warehousing and OLAP DOLAP '06**
Publisher: ACM Press
 Full text available:  [pdf\(249.90 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

In this paper we perform an extensive theoretical and experimental study on common synopsis construction algorithms, with emphasis on wavelet based techniques, that take under consideration query workload statistics. Our goal is to compare, "expensive" quadratic time algorithms with "cheap" near-linear time algorithms, particularly when the latter are not optimal and/or not workload-aware for the problem at hand. Further, we present the first known algorithm for constructing wavelet synopses for ...

Keywords: OLAP, synopsis, wavelet, workload-aware

- 20 iVIBRATE: Interactive visualization-based framework for clustering large datasets



Keke Chen, Ling Liu

April 2006 **ACM Transactions on Information Systems (TOIS)**, Volume 24 Issue 2**Publisher:** ACM PressFull text available: pdf(4.48 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

With continued advances in communication network technology and sensing technology, there is astounding growth in the amount of data produced and made available through cyberspace. Efficient and high-quality clustering of large datasets continues to be one of the most important problems in large-scale data analysis. A commonly used methodology for cluster analysis on large datasets is the three-phase framework of sampling/summarization, iterative cluster analysis, and disk-labeling. There are th ...

Keywords: Clustering, interactive visualization, labeling, large datasets, performance

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10/822,996

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Chris Butlin. *The*. Jan 10, 2006. p. 11

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2 Sassy: a language and optimizing compiler for image processing on reconfigu

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Inspec - 1898 to date (INZZ)

Accession number & update

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Title

A clustering method based on **multidimensional** texture analysis.

Source

Pattern Recognition, {Pattern-Recognit-UK}, July 2006, vol. 39, no. 7, p. 1265-77, 36 refs, CODEN: PTNRA8, ISSN: 0031-3203.

Publisher: Elsevier, UK.

Author(s)

Postaire-J-G, Hammouche-K, Diaf-M.

Author affiliation

Postaire, J.-G., UMR CNRS, Univ. des Sci. et Technol. de Lille LAGIS, Villeneuve d'Ascq, France.

Abstract

Considering the analogy between image segmentation and cluster analysis, the aim of this paper is to adapt statistical texture measures to describe the spatial distribution of **multidimensional** observations. The main idea is to consider the cluster cores as domains characterized by their specific textures in the data space. The distribution of the data points is first described as a **multidimensional histogram** defined on a **multidimensional** regular **array** of sampling points. In order to evaluate locally a **multidimensional** texture, a co-occurrence matrix is introduced, which characterizes the local distribution of the data points in the **multidimensional** data space. Several local texture features can be computed from this co-occurrence matrix, which accumulates spatial and statistical information on the data distribution in the neighborhoods of the sampling points. Texture features are selected according to their ability to discriminate different distributions of data points. The sampling points where the local underlying texture is evaluated are categorized into different texture classes. The points assigned to these classes tend to form connected components in the data space, which are considered as the cores of the clusters. (All rights reserved Elsevier).

Descriptors

10/ 822, 996

July 2006, vol. 39, no. 7, p. 1265-77

FEATURE-EXTRACTION; IMAGE-SEGMENTATION; IMAGE-TEXTURE; MATRIX-ALGEBRA;
PATTERN-CLUSTERING; STATISTICAL-ANALYSIS.

Classification codes

B6135 Optical-image-and-video-signal-processing*;
B0240Z Other-topics-in-statistics;
B0210 Algebra;
C5260B Computer-vision-and-image-processing-techniques*;
C1140Z Other-topics-in-statistics;
C1110 Algebra.

Keywords

clustering-method; **multidimensional-texture-analysis**; image-segmentation; statistical-texture-measure; **multidimensional-histogram**; spatial-distribution; cooccurrence-matrix; texture-feature-selection.

Treatment codes

P Practical;
I Theoretical-or-mathematical.

Language

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Publication type

Journal-paper.

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Inspec - 1898 to date (INZZ)**Accession number & update**

0006338311 20070101.

Title

Sassy: a language and optimizing compiler for image processing on reconfigurable computing systems.

Conference information

Computer Vision Systems. First International Conference, ICVS'99. Proceedings, Las Palmas, Spain, 13-15 Jan. 1999.

Sponsor(s): Spanish Minstr. Educ; Cabildo de Gran Canaria; Univ. Las Palmas; El Corte Ingles; et al.

Source

Computer Vision Systems. First International Conference, ICVS'99. Proceedings, 1999, p. 83-97, 30 refs, pp. xi+564, ISBN: 3-540-65459-3. Publisher: Springer-Verlag, Berlin, Germany.

Author(s)

Hammes-J-P, Draper-B-A, Bohm-A-P-W.

Editor(s): Christensen-H-I.

Author affiliation

Hammes, J.P., Draper, B.A., Bohm, A.P.W., Colorado State Univ., Fort Collins, CO, USA.

Abstract

This paper presents Sassy, a single-assignment variant of the C programming language developed in concert with Khoros Incorporated, and designed to exploit both coarse-grain and fine-grain parallelism in image processing applications. Sassy programs are written in the Khoros software development environment, and can be manipulated inside Cantata (the Khoros GUI). The Sassy language supports image processing with true **multidimensional** arrays, sophisticated **array** access and windowing mechanisms, and built-in reduction operators (e.g., **histogram**). At the same time, Sassy restricts C so as to enable compiler optimizations for parallel execution environments, with the goal of reducing data traffic, code size and execution time. In particular, the Sassy language and its optimizing compiler target reconfigurable systems, which are fine-grain parallel processors. Reconfigurable systems consist of field-programmable gate arrays (FPGA), memories and interconnection hardware, and can be used as inexpensive co-processors with conventional workstations or PC. The compiler optimizations needed to generate highly optimal host, FPGA, and communication code, are discussed. The massive parallelism and high throughput of reconfigurable systems makes them well-suited to image processing tasks, but they have not previously been used in this context because they are typically programmed in hardware description languages such as VHDL. Sassy was developed as part of the Cameron project, with the goal of elevating the programming level for reconfigurable systems from hardware circuits to programming language.

Descriptors

C-LANGUAGE; FIELD-PROGRAMMABLE-GATE-ARRAYS; GRAPHICAL-USER-INTERFACES; IMAGE-PROCESSING; OPTIMISING-COMPILERS; PARALLEL-LANGUAGES; PROGRAMMING-ENVIRONMENTS; RECONFIGURABLE-ARCHITECTURES.

Classification codes

B6135 Optical-image-and-video-signal-processing*;
C5260B Computer-vision-and-image-processing-techniques*;
C6150C Compilers-interpreters-and-other-processors;
C6140D High-level-languages;
C6110P Parallel-programming;
C6115 Programming-support.

Keywords

Sassy-language; optimizing-compiler; image-processing; reconfigurable-computing-systems; C-programming-language; single-assignment-variant; coarse-grain-parallelism; fine-grain-parallelism; Khoros-software-development-environment; Cantata-GUI; **multidimensional-arrays; array- access;** windowing; reduction-operators; field-programmable-gate-arrays; FPGA; co-processors; communication-code; Cameron-project.

Treatment codes

P Practical.

Language

English.

Publication type

Conference-paper.

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Publication date

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Edition

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0005758408 20070101.

Title

Segmentation of a class of ophthalmological images using a directional variance operator and co-occurrence arrays.

Source

Optical Engineering, {Opt-Eng-Bellingham-USA}, Nov. 1997, vol. 36, no. 11, p. 3140-7, 20 refs, CODEN: OPEGAR, ISSN: 0091-3286.

Publisher: SPIE, USA.

Author(s)

Papinski-A-P, Boyce-J-F.

Author affiliation

Papinski, A.P., Dept. of Digital Syst., Monash Univ., Clayton, Vic., Australia.

Abstract

The posterior capsule opacification images considered are images of the membrane encapsulating an artificial lens implanted during cataract surgery in place of the natural lens. The images are taken to monitor the state of the patient's vision after the surgery. Subsequent to the surgery, the membrane of the posterior capsule may become opacified, thus degrading the patient's vision. The authors discuss the methodology used and the results obtained in the segmentation of the images into transparent and opacified regions. The opacification is primarily characterized by its texture, therefore a directional standard deviation operator is applied to an image giving rise to a family of "conjugate" images. From these images, the multi-dimensional **histogram (co-occurrence) array** is calculated and subsequently approximated by Gaussian distributions to form the basis for the segmentation step.

Descriptors

EYE; IMAGE-SEGMENTATION; IMAGE-TEXTURE; MEDICAL-IMAGE-PROCESSING; OPTICAL-IMAGES.

Classification codes

A8760G Microwaves-and-other-electromagnetic-waves-medical-uses*;

A8732 Physiological-optics-vision;

A8770E Patient-diagnostic-methods-and-instrumentation;

B7510B Radiation-and-radioactivity-applications-in-biomedicine*;

B6140C Optical-information-image-and-video-signal-processing;

C7330 Biology-and-medical-computing*;

C5260B Computer-vision-and-image-processing-techniques.

Keywords

ophthalmological-images-segmentation; directional-variance-operator; cooccurrence-arrays; posterior-capsule-opacification-images; artificial-lens-encapsulating-membrane; directional-standard-deviation-operator; conjugate-images-family; **multidimensional- histogram-array**; patient's-vision-monitoring; opacified-membrane; Gaussian-distributions; medical-diagnostic-images.

Treatment codes

I Theoretical-or-mathematical.

Language

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Publication type

Journal-paper.

Availability

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